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AUTHOR Coker, Homer; Lorentz, Jeffrey L.
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ABSTRACT

This study examined the relationship between observed classroom behavior (teacher-pupil interactions) and reading achievement. An elementary school reading teacher and six students with different coping styles were observed six times in each of 41 classrooms during the school year. Pretest and posttest reading scores, a measure for socioeconomic status, grade level, and scores from 21 categories of the "Spaulding Teacher Activity Rating Schedule" (STARS) were the variables used. Results indicate that the pretest is the best indicator of reading achievement (accounting for almost two-thirds of the variance); that several of the STARS scores are better predictors of reading achievement than either grade level or socioeconomic status; that a negative relationship exists between reading and some teacher/pupil interactions that were supposed to be "good," such as structuring supervisor and supportive guide; and that a positive relationship exists between reading achievement and egocentric instructor. These findings suggest that, although the pretest is the best indicator of a student's growth in reading, observed behaviors of both students and teachers may be useful predictors of reading achievement. (RL)

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Observed Patterns of Teacher-Pupil Classroom Behavior
as Predictors of Student Growth in Reading

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Homer Coker
Jeffrey L. Lorentz

West Georgia College

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The data reported herein were collected as part of the Carroll County Competency Based Teacher Certification Project, conducted by the School of Education, West Georgia College, and Carroll County, Georgia, teachers, under an ESEA Title III Grant from the Division of Program and Staff Development, Georgia State Department of Education. The major objective of the project is the development of a system for the re-certification of experienced classroom teachers which is a potential alternative to the program-approved approach currently in use in Georgia.

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Introduction

This is the third in a series of papers which explore relationships between observed classroom behavior and student achievement in Reading. In two earlier studies, the investigators reported significant relationships between classroom mean student Coping Style, teacher control, and Reading achievement (Coker and Lorentz, 1975), as well as between individual student Coping Style and Reading achievement (Coker and Lorentz, 1976). The present paper is a further examination of data collected in 1974-76 as part of the Carroll County CBTC Project. It is the purpose of the present study to examine the relationship between observed classroom behavior, specifically, teacher-pupil interactions and Reading achievement.

It was hypothesized that certain teacher-pupil interactions, as recorded by direct observation using the Spaulding Teacher Activity Rating Schedule would be significant predictors of end of year Reading achievement.

Method

Subjects

The subjects of the present study, 41 classroom teachers, grades 3-8, are a subset of the population of 103 teachers who participated in the CBTC Project during the 1974-76 school year (1974-75 sample = 26 classes, 1975-76 sample = 15 additional classes). Only those teachers who taught Reading as a major subject are included in the sample selected for the present study.

Measures

The Iowa Tests of Basic Skills, Form 5 and 6, Levels Edition, (ITBS) (A.N. Hieronymus and E.F. Lindquist, 1971) was given to all pupils in grades 3 through 7 who were involved in the CBTC Project. The Reading Comprehension subtest only was used in the present study. The reported reliability and validity for the ITBS are adequate for use in the present study. In addition, the State of Georgia used the ITBS in the 4th and 8th grades in its state-wide testing program.

The Spaulding Teacher Activity Rating Schedule (STARS) (Spaulding, 1975) is a category system which examines the cognitive instructional strategies of teachers as well as their affective and control techniques. STARS consists of 25 categories of teacher behavior which are subsumed under the subtitles of affective behavior, motor and social structuring, concept attainment, concept checking, and value expression, as they interact with 19 categories of student behavior which are identified by descriptive statements such as "Aggressive Behavior", "Self-directed Activity", "Observing Passively", etc. STARS has been developed

over a period of ten years and is currently being used in a number of studies.

Socioeconomic Status

An estimate of the socioeconomic status (SES) was obtained for each pupil based upon the occupation of the family's principal bread-winner. This occupational information was transformed to a 1-8 scale (1=high status, 8=low status) using a modified version of Warner, Meeker, and Eells (1960) classification of occupations and levels. Pupils with missing SES were assigned the mean for their classroom, rounded to the nearest whole number.

Procedures

Data Collection

The initial Reading tests were administered early in the Fall in the classrooms of the 41 Carroll County teachers, and posttests administered in late Spring in the classrooms of the same 41 teachers. A group of specially-trained testers administered the tests in each classroom.

After the pretests had been administered, each of the approximately 1200 pupils in the 41 classes was observed on two separate visits during a three-week period by observers using the CASES observation instrument (Spaulding, 1970). Each pupil's record was scored to identify a predominant coping style, such as Aggressive, Passive, Task-oriented, etc.

After the pretests had been administered and the CASES scored, six pupils with different predominant coping styles were randomly selected from each classroom. These six students were used in subsequent observations using STARS. Six such observations were made in each classroom during the remainder of the school year.

Visits were scheduled in advance, but no attempt was made to preselect the activities to be observed, since the intent was to record a representative sample of the behavior present in each classroom.

All observations were made by experienced classroom teachers who had been employed full-time by the CBTC Project as observers and been personally trained by the author of CASES and STARS, Dr. Robert Spaulding. Observer agreement studies, conducted in non-project classrooms, confirmed that the observers were consistently able to maintain agreement of 80 percent or better.

Scoring

Tests were hand or machine scored, keypunched and verified. Observation data were keypunched from the data collection forms and verified. All data processing was performed at West Georgia

College's Computer Center.

ITBS scores were converted from raw scores to Standard Scores using the published Standard Score Tables (Houghton Mifflin, 1973). These scores used a normalized standard score scale with a mean of 80 and a standard deviation of 20 for the entire grade range, 3-8 data in a single analysis.

STARS frequencies for each pupil were combined using Spaulding's procedure (Spaulding, personal communication) to identify twenty-one scores. These are derived from combinations of behaviors recorded in the 475 cell (i.e. 25x19) student/teacher interaction matrix and labeled with titles descriptive of individual teaching behaviors. These are listed in Figure 1.

INSERT FIGURE 1 HERE

Data Analysis

The pretest and posttest Reading scores, a SES measure, grade level and twenty-one STARS scores then, were the variables used in the present study. The means and standard deviations for each variable, by grade level and total group are presented in Table 1.

INSERT TABLE 1 HERE

Two additional variables were generated for each student. These were pretest squared (Pre x Pre) and the product of pretest and grade level (Pre x Grade). The product term, Pre x Grade, was entered since the correlations of pretest and posttest tend to increase at higher grade levels, and this term permits fitting different regression slopes at different grade levels. The pretest squared term permits fitting a two degree curve to the relation between pretest and posttest, and tests if a non-linear fit is significantly better than a linear one.

Regression Analysis

To examine the relationships between the STARS scores and Reading Achievement, two stepwise multiple regression analyses were carried out using the SPSS (Nie and others, 1975) regression procedure.

The dependent variable in both analyses was posttest. In the first analysis, the independent variables were forced to enter the equation in the following order: pretest, grade and SES, pre x grade and pretest squared, and finally STARS 1 through STARS 21. In the second analysis, pretest was forced to enter first and the remaining variables were permitted to enter in the order in which they accounted for additional proportions of the variance.

Results

As expected, pretest is the best predictor of posttest Reading ($R = .81$), accounting for nearly two-thirds of the variance. Several STARS scores were better predictors of posttest reading than were grade and SES. Therefore, the second analysis, in which all variables were permitted to enter the equation depending on their contribution, is considered in the following discussion. Table 2 presents the variables in their order of entry into the

INSERT TABLE 2 HERE

equation and includes, for each step, the multiple R and multiple R squared; the simple r (zero-order correlation of that variable with posttest); b-value and beta (unstandardized and standardized regression weights); and finally, the F to enter the equation.

In addition to pretest, six other variables were significant predictors of posttest Reading. However, an examination of the summary table revealed very little improvement in multiple R resulted from the addition of the seventh and subsequent variables. The six-variable equation (after the 6th step) is as follows:

$$\hat{Y} = 38.03 + 0.47(\text{Pre}) - 0.87(\text{S21}) + 0.03(\text{Pre} \times \text{Gr}) - 7.10(\text{S19}) \\ - 1.09(\text{SES}) + 0.67(\text{S20})$$

Where:

$\hat{Y}$ = Predicted Posttest Reading
 Pre = Pretest
 S21 = Structuring Supervisor
 S19 = Supportive Guide
 S20 = Egocentric Instructor
 Gr = Grade Level
 SES = Social Status

All the variables in this equation are significant ($p < .05$) predictors of posttest reading.

Discussion

One unexpected result was that several of the STARS scores were better predictors of Reading achievement than were either Grade level or SES. Another surprising finding was the negative relationship between Reading and teacher/pupil interactions judged to be "good" such as Structuring Supervisor and Supportive Guide. Likewise the positive relationship between Reading achievement and Egocentric Instructor.

The lack of significant contribution of other "good" STARS scores such as Discovery Teacher and Socratic Teacher is probably due to the low frequency of these behaviors in the Carroll County data.

Conclusion

These findings are in general agreement with other studies. They suggest that while the best indicator of a student's growth in Reading is his pretest score, observed behaviors of both students and teachers may be useful predictors of achievement in Reading.

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FIGURE 1

STARS SCORES

1. Effective Story Teller

Pupils attend closely to teacher's motivating comments and respond with personal experiences.

2. Boring Lecturer

Pupils engage in off-task behavior and attention wanders while teacher lectures.

3. Examiner

Pupils conform passively while teacher asks for recall, use, or application of facts or concepts at a low cognitive level.

4. Entertainer

Pupils attend closely while teacher comments on items of interest extraneous to topic under discussion.

5. Controller

Pupils conform while teacher reminds them of rules of behavior, procedures, or redirects them into another activity.

6. Counselor

Pupils seek attention or support while teacher responds by reminding them of rules and procedures, providing structure by setting goals, or reinforcing their bids for attention.

7. Pseudo-Peer

Pupils engage in off-task behavior while teacher digresses or comments on items of interest extraneous to the topic under discussion.

8. Discovery Teacher

Pupils attend closely or contribute while the teacher asks them to operate inductively or transductively at a low cognitive level.

FIGURE 1 (continued)

STARS SCORES

9. Socratic

Pupils attend closely, contribute ideas, and follow directions submissively while the teacher asks them to operate deductively at a low or high cognitive level.

10. Effective Manager

Teacher withholds reinforcement in response to a pupil's aggressive, annoying behavior; ignores pupil's annoying, resisting or dominating behavior; reinforces students sharing of interests or contributions; provides directions in response to pupil's requests for assistance; listens or observes self-directed, on-task behavior.

11. Expository

Teacher describes or tells facts while pupils listen closely or volunteer to share ideas. Teacher identifies specific dimensions of a cognitive task while pupils volunteer to respond. Teacher asks pupils to apply concepts explained.

12. Rote Process

Teacher instructs in a repetition manner at a low cognitive level while pupils eagerly respond imitating the pattern modeled by the teacher.

13. Style A Treatment Schedule

Teacher responds to pupil's aggressive behavior by setting strict, narrow limits; supervising closely; punishing all unacceptable behavior immediately by social isolation; reinforcing all emerging desirable behavior.

14. Style B Treatment Schedule

Teacher responds to pupil's inappropriately self-directed behavior by ignoring resistance and delay; reinforcing all task oriented, productive behavior; ignore dependent, passive conformity.

FIGURE 1 (continued)

STARS SCORES

15. Style C Treatment Schedule

Teacher responds to pupil's passive, withdrawn behavior by setting narrow, clearly defined limits; providing structure and support; reinforcing all emerging active, pro-social behavior; ignoring anti-social aggressive, withdrawn, or dependent behavior.

16. Style D Treatment Schedule

Teacher responds to pupil's peer dependent behavior by setting narrow, clearly defined limits, reinforcing all emerging desirable behavior, punishing unacceptable behavior by social isolation, and ignoring teacher-dependent behavior.

17. Style EFG Treatment Schedule

Teacher responds to pupil's compliant, dependable behavior, by setting relatively broad limits, encouraging pupil to select his own work station, reinforcing all emerging task-oriented academic and social behavior, ignoring conformity, ignoring minor inappropriate independent or social interaction.

18. Responsive Explainer

Pupils seek help or assistance and teacher describes, explains, points out relevant subject matter items, or identifies specific dimensions of a cognitive task.

19. Supportive Guide

Teacher praises task-oriented behavior, encourages and motivates pupils who seek help in solving cognitive tasks, responds to pupils' requests for assistance by asking for recall of facts or for application of specific principles.

20. Egocentric Instructor

Teacher responds to pupil's contributions or requests for help by digressing from the subject matter at hand.

21. Structuring Supervisor

The teacher responds to off-task, integrative social behavior of pupils by giving directions, setting limits, asking recall of specific items of subject matter, or asking application of rules or principles. The teacher responds to pupils' off-task self-directed behavior or distraction by asking recall or application of specific items or concepts.

Table 1
Means and Standard Deviations

Variable		Grade						Total Group
		3	4	5	6	7	8	
	N =	(11)	(36)	(69)	(34)	(32)	(21)	(203)
Pre-Reading	Mean	50.91	59.50	70.20	78.29	80.91	99.57	73.34
	S.D.	13.65	11.59	12.65	10.99	10.23	13.49	17.02
Post-Reading	Mean	60.09	62.94	73.97	77.11	85.62	101.47	76.47
	S.D.	15.26	12.57	12.73	14.14	11.51	12.24	17.00
SES	Mean	4.90	4.75	4.78	4.85	5.03	4.42	4.79
	S.D.	1.04	1.69	1.50	1.28	1.20	1.36	1.41
1. Effective Story Teller	Mean	1.15	1.06	1.56	0.77	1.34	1.85	1.31
	S.D.	1.70	1.37	3.39	1.25	2.35	2.11	2.45
2. Boring Lecturer	Mean	0.55	3.43	3.16	2.85	4.65	6.34	3.58
	S.D.	0.66	2.68	2.79	2.42	3.38	4.66	3.22
3. Examiner	Mean	10.63	10.04	9.21	7.81	5.06	8.22	8.44
	S.D.	7.27	5.29	6.28	5.19	4.32	4.52	5.73
4. Entertainer	Mean	1.44	1.46	2.38	1.57	2.14	4.44	2.21
	S.D.	1.58	1.32	3.34	1.36	1.83	5.71	2.99
5. Controller	Mean	0.78	1.20	0.55	1.04	0.87	0.34	0.79
	S.D.	0.57	0.77	0.41	1.51	0.92	0.33	0.88
6. Counselor	Mean	0.00	0.07	0.05	0.22	0.05	0.03	0.08
	S.D.	0.00	0.11	0.15	0.53	0.13	0.05	0.25
7. Pseudo Peer	Mean	0.00	0.22	0.11	0.20	0.17	0.40	0.18
	S.D.	0.01	0.39	0.22	0.39	0.30	0.47	0.33
8. Discovery Teacher	Mean	1.56	0.62	0.59	0.61	0.44	0.73	0.64
	S.D.	0.99	0.69	0.72	1.00	0.61	0.88	0.81
9. Socratic Teacher	Mean	0.18	0.12	0.11	0.05	0.05	0.18	0.10
	S.D.	0.33	0.21	0.22	0.14	0.11	0.46	0.24
10. Effective Manager	Mean	0.09	0.15	0.15	0.11	0.10	0.07	0.13
	S.D.	0.20	0.22	0.32	0.18	0.19	0.13	0.24

Table 1 (continued)

Variable		Grade						Total Group
		3	4	5	6	7	8	
	N =	(11)	(36)	(69)	(34)	(32)	(21)	(203)
11. Effective Expository Tchr	Mean	0.55	0.43	0.38	0.33	0.46	0.58	0.42
	S.D.	0.75	0.64	0.89	0.64	0.84	0.85	0.79
12. Rote Process	Mean	7.23	8.18	4.85	4.91	5.65	3.22	5.53
	S.D.	4.44	4.31	4.01	3.12	4.38	2.47	4.11
13. Style A Treatment	Mean	1.12	1.24	0.93	1.08	1.08	0.51	1.00
	S.D.	1.41	0.85	0.93	0.82	1.26	0.58	0.97
14. Style B Treatment	Mean	0.05	0.11	0.08	0.08	0.06	0.10	0.08
	S.D.	0.13	0.24	0.17	0.12	0.12	0.22	0.17
15. Style C Treatment	Mean	0.48	0.66	0.45	0.49	0.51	0.22	0.48
	S.D.	0.37	0.63	0.45	0.41	0.54	0.24	0.48
16. Style D Treatment	Mean	1.17	1.37	0.99	1.16	1.14	0.55	1.07
	S.D.	1.17	0.81	1.01	0.85	1.34	0.58	1.00
17. Style EFG Treatments	Mean	0.06	0.10	0.08	0.07	0.05	0.10	0.08
	S.D.	0.14	0.26	0.15	0.12	0.13	0.24	0.18
18. Respons. Explainer	Mean	3.62	6.61	4.29	5.30	5.81	5.41	5.19
	S.D.	2.45	2.18	2.46	2.37	3.04	1.65	2.57
19. Support. Guide	Mean	0.04	0.24	0.09	0.22	0.07	0.05	0.13
	S.D.	0.09	0.39	0.20	0.40	0.18	0.09	0.28
20. Egocentric Instructor	Mean	0.77	1.72	1.91	2.00	2.01	4.34	2.10
	S.D.	0.77	1.45	2.31	1.60	1.45	4.02	2.27
21. Structuring Supervisor	Mean	1.10	4.16	2.55	3.05	2.77	2.25	2.84
	S.D.	1.03	2.27	1.96	2.07	1.87	1.65	2.07

TABLE 2
SUMMARY TABLE

Variable	Multiple		Simple	B	Beta	F to Enter
	R	RSQ	r			
Pre-Reading	81	652	81	-0.12	-0.11	376.18 **
21. Structuring Supervisor	82	668	-23	-0.99	-0.12	10.01 **
Pre x Grade	83	682	78	-0.05	-0.59	8.46 **
19. Supportive Guide	83	692	-20	-5.30	-0.09	6.48 *
SES	84	700	-27	-1.13	-0.09	5.41 *
20. Egocentric Instructor	84	707	32	1.22	0.16	4.65 *
2. Boring Lecturer	84	711	15	-0.45	-0.08	2.77
17. Style EFG Treatment	85	715	-03	-19.17	-0.21	2.32
10. Effective Manager	85	722	-01	12.96	0.18	5.09 *
13. Style A Treatment	85	724	02	0.85	0.05	1.42
Pretest Squared	85	726	81	0.01	1.02	1.07
Grade	85	730	64	6.73	0.54	3.21
3. Examiner	86	732	-18	-0.22	-0.07	1.64
6. Counselor	86	734	-07	-5.40	-0.08	1.48
4. Entertainer	86	735	32	-0.40	-0.07	0.70
12. Rote Process	86	735	-16	0.14	0.03	0.33
8. Discovery	86	736	-12	-1.15	-0.06	0.46
9. Socratic	86	737	06	2.16	0.03	0.62
15. Style C Treatment	86	737	-09	-2.21	-0.06	0.20
1. Effective Story Teller	86	737	19	-0.36	-0.05	0.19
11. Expository	86	738	08	0.69	0.03	0.27
5. Controller	86	738	-07	0.39	0.02	0.09
7. Pseudo Peer	86	738	15	-0.69	-0.01	0.09
14. Style B Treatment	86	738	-03	3.94	0.04	0.02
18. Responsive Explainer	86	738	07	0.04	0.00	0.01

*** p < .001

** p < .01

* p < .05